REMARKS

Claims

Upon entry of the present Amendment, claims 1-10, 21, 22, and 24 will be pending in the application with claim 1 being independent. No claims have been amended. Independent claim 23 has been canceled and dependent claim 24 has been added. Reconsideration is respectfully requested.

Double Patenting

Claims 1-3, 5, 6, and 8-10 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6, 7, and 9-11 of co-pending Application No. 10/924,270. Claims 1-3, 5, 6, and 8-10 also stand provisionally rejected on the ground of obviousness-type double patenting as being unpatentable over claims 1-3 and 7-11 of co-pending Application No. 10/999,581. Although Terminal Disclaimers have not been submitted in conjunction with the present Amendment, Applicants are prepared to submit such Terminal Disclaimers in the future upon an indication of allowable subject matter by the Examiner.

Claim Rejections – 35 U.S.C. §112, first paragraph

Claim 23 stands rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Independent claim 23 has been canceled. The canceling of independent claim 23 is not an admission that the rejection to independent claim 23 was proper, but rather to move this application to allowance.

Claims Rejections – 35 U.S.C. §103(a)

Claims 1-6, 8-10, and 21-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Van Steenkiste et al. (U.S. Patent No. 6,283,386) in view of Kay et al. (U.S. Pub No. 2001/0042508, issued as U.S. Patent No. 6,502,767). Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Van Steenkiste et al. in view of Kay et al. and further in view of Schwarz et al. (U.S. Patent No. 5,273,957). Independent claim 23 has been canceled. Applicants respectfully traverse the rejection to independent claim 1.

Independent claim 1 defines over the cited prior art, either alone or in combination, by reciting a method of kinetic spray coating a substrate that requires, among other things, entraining particles of a powder into a flow of main gas in a gas/powder exchange chamber 49 and directing the entrained particles to a powder/gas conditioning chamber 80 disposed downstream of the gas/powder exchange chamber 49. The powder/gas conditioning chamber 80 has a length L along a longitudinal axis of equal to or greater than 80 millimeters to expose the particles to the main gas for a sufficient amount of time to increase a temperature of the particles without heating the particles to a temperature above a melting temperature of the particles. From the powder/gas conditioning chamber 80, the particles enter a converging diverging supersonic nozzle 54. The increase in temperature of the particles between the gas/powder exchange chamber and the nozzle facilitates adherence of the particles to the substrate.

Van Steenkiste et al. and Kay et al. disclose kinetic spraying systems that include a gas/powder exchange chamber for entraining particles of a powder into a main gas and directing the entrained particles into a nozzle, but they lack a powder/gas conditioning chamber disposed between the gas/powder exchange chamber and the nozzle that has a length equal to or greater than 80 millimeters. Notably, the inventive significance of the powder/gas conditioning chamber and its length equal to or greater than 80 millimeters (e.g. 240 millimeters) can easily be realized with reference to Figure 4 and Paragraph [0041] of the subject application. Here, the increase in temperature of the particles due to the

existence of the powder/gas conditioning chamber, as compared to a system that only includes a gas/powder exchange chamber going directly to a nozzle, such as in Van Steenkiste et al. and Kay et al., can be realized by comparing reference lines 100, 102, and 104 to reference lines 106, 108, and 110.

The Examiner indicates on page 17 of the last Office Action mailed February 5, 2007 that the combination of Van Steenkiste et al. and Kay et al. "provides the suggestion to optimize the length [of a gas/powder exchange chamber], which would include providing a new system with an optimized longer length." The Examiner relies heavily on the suggestion in Van Steenkiste et al. that an increase in overall gas temperature equates to an increase in velocity of the particles and that an increase in velocity of the particles results in higher deposition efficiencies. In essence, the Examiner argues that one having ordinary skill in the art would realize from Van Steenkiste et al. that a longer gas/powder exchange chamber (or adding a gas/powder conditioning chamber) would result in better deposition efficiency due to the increase in overall gas temperature in the gas/powder exchange chamber inherent from the increased mixing time of the heated main gas with the unheated powder gas. However, even though the results from having a longer chamber seem obvious to the Examiner, no one has provided a longer chamber to provide higher deposition efficiency until now.

Applicants respectfully submit that there may be several reasons why others have not lengthened the gas/powder exchange chamber in prior art systems. For instance, increasing the length could result in heat loss to ambient (outside the system), pressure drops due to increased wall friction, and the like. Furthermore, and contrary to the Examiner's beliefs, there is no evidence that increasing a length of the gas/powder exchange chamber in prior art systems would result in corresponding increases in overall gas temperature and an increase in particle velocity. In fact, referring to page 15, paragraph 0048 of the subject application, the inventors significantly note that "there was almost no change in the particle velocity upon exit from the nozzle 54 under either of these conditions." The conditions mentioned

include a gas/powder conditioning chamber having either a length of L=0 mm or L=240 mm. In other words, contrary to the Examiner's contention, there is "almost no change" in velocity when increasing a length of prior art gas/powder exchange chambers or providing a gas/powder conditioning chamber. This alone explains why one skilled in the art would not be motivated to increase the length of prior art powder/gas exchange chambers. The inventors go on to explain in paragraph 0048 that "it is believed that the majority of the increase in deposition efficiency is due to the increase in the particle temperature caused by the presence of the powder/gas conditioning chamber 80."

For this reason, Applicants respectfully submit that the combination of Van Steenkiste et al. and Kay et al. does not suggest claim 1. There is no suggestion provided by the combination of Van Steenkiste et al. and Kay et al. to increase a powder/gas exchange chamber's length to increase particle velocity. As noted by the inventors, to do so would result in "almost no change" in particle velocity. Therefore, independent claim 1 is in condition for allowance. Applicants also submit that dependent claims 2-10, 21, 22, and 24 are in condition for allowance based on their own merits, and based on their dependency to independent claim 1 and the failure of the references to suggest claim 1.

Dependent claim 24 has been added to the application. Dependent claim 24 further defines over the cited prior art, either alone or in combination, by reciting a first housing portions defining the gas/powder exchange chamber 49 and a second housing portion defining the powder/gas conditioning chamber 80. The second housing portion releasably engages the first housing portion and the supersonic nozzle.

Applicants believe the application is now in condition for allowance, which allowance is respectfully solicited. Applicants believe that no fees are required. However, the Commissioner is authorized to charge our Deposit Account No. 08-2789 for any additional fees or credit the account for any overpayment.

Respectfully submitted,

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